

ABSTRACT

The construction of a film on a wafer, which is placed in a processing chamber, may be carried out through the following steps. A layer of material is deposited on the wafer. Next, the layer of material is annealed. Once the annealing is completed, the material may be oxidized. Alternatively, the material may be exposed to a silicon gas once the annealing is completed. The deposition, annealing, and either oxidation or silicon gas exposure may all be carried out in the same chamber, without need for removing the wafer from the chamber until all three steps are completed. A semiconductor wafer processing chamber for carrying out such an *in-situ* construction may include a processing chamber, a showerhead, a wafer support and a rf signal means. The showerhead supplies gases into the processing chamber, while the wafer support supports a wafer in the processing chamber. The rf signal means is coupled to the showerhead and the wafer support for providing a first rf signal to the showerhead and a second rf signal to the wafer support.